

WHAT IS CLAIMED IS:

1. A method for self-calibrating mismatching and non-linearity occurring in a receiver in a mobile terminal including a transmitter, the receiver, 5 a switch for connecting an output terminal of the transmitter to an input terminal of the receiver, and a controller having an in-phase output terminal and a quadrature-phase output terminal connected to the transmitter, and having an in-phase input terminal and a quadrature-phase input terminal connected to the receiver, the method comprising the steps of:
 - 10 providing an output of the transmitter to the receiver via the switch;
 - generating a first test signal associated with the in-phase output terminal and transmitting the first test signal through the transmitter;
 - detecting an in-phase measurement signal provided via the in-phase input terminal and a quadrature-phase measurement signal provided via the quadrature- 15 phase input terminal by processing the first test signal received via the switch in the receiver;
 - if the quadrature-phase measurement signal does not have a value approaching '0', calibrating mismatching of the quadrature-phase measurement signal by controlling the receiver, estimating distortion in the in-phase measurement signal, and then calibrating the distortion of the in-phase measurement signal by controlling the receiver;
 - 20 generating a second test signal associated with the quadrature-phase output terminal, and transmitting the second test signal via the transmitter;

detecting an in-phase measurement signal provided via the in-phase input terminal and a quadrature-phase measurement signal provided via the quadrature-phase input terminal by processing the second test signal received via the switch in the receiver;

- 5 if the in-phase measurement signal does not have a value approaching '0', calibrating mismatching of the in-phase measurement signal by controlling the receiver, estimating distortion in the quadrature-phase measurement signal, and then calibrating the distortion of the quadrature-phase measurement signal by controlling the receiver; and
- 10 if the calibration of the mismatching and the distortion is completed, controlling the switch to cut off a connection between the output terminal of the transmitter and the input terminal of the receiver.

2. The method of claim 1, further comprising the step of
15 attenuating at least one of the first and the second test signals transmitted from the transmitter at a predetermined rate under the control of the controller.

3. A method for self-calibrating mismatching and non-linearity occurring in a receiver in a mobile terminal including a transmitter, the receiver, 20 a switch for connecting an output terminal of the transmitter to an input terminal of the receiver, and a controller having an in-phase output terminal and a quadrature-phase output terminal connected to the transmitter, and having an in-phase input terminal and a quadrature-phase input terminal connected to the receiver, the method comprising the steps of:

providing an output of the transmitter to the receiver via the switch;

generating a first test signal associated with the in-phase output terminal and transmitting the first test signal through the transmitter;

detecting an in-phase measurement signal provided via the in-phase input terminal and a quadrature-phase measurement signal provided via the quadrature-phase input terminal by processing the first test signal received via the switch in the receiver;

if the quadrature-phase measurement signal does not have a value approaching '0', calibrating mismatching of the quadrature-phase measurement signal by controlling the transmitter, estimating distortion in the in-phase measurement signal, and then calibrating the distortion of the in-phase measurement signal by controlling the transmitter;

generating a second test signal associated with the quadrature-phase output terminal, and transmitting the second test signal via the transmitter;

15 detecting an in-phase measurement signal provided via the in-phase input terminal and a quadrature-phase measurement signal provided via the quadrature-phase input terminal by processing the second test signal received via the switch in the receiver;

if the in-phase measurement signal does not have a value approaching '0',

20 calibrating mismatching of the in-phase measurement signal by controlling the transmitter, estimating distortion in the quadrature-phase measurement signal, and then calibrating the distortion of the quadrature-phase measurement signal by controlling the transmitter; and

if the calibration of the mismatching and the distortion is completed, controlling the switch to cut off a connection between the output terminal of the transmitter and the input terminal of the receiver.

5 4. The method of claim 3, further comprising the step of attenuating at least one of the first and second test signals transmitted from the transmitter at a predetermined rate under the control of the controller.

5. A method for self-calibrating mismatching and non-linearity
10 occurring in a receiver in a mobile terminal including a transmitter, the receiver, a switch for connecting an output terminal of the transmitter to an input terminal of the receiver, and a controller having an in-phase output terminal and a quadrature-phase output terminal connected to the transmitter, and having an in-phase input terminal and a quadrature-phase input terminal connected to the
15 receiver, the method comprising the steps of:

 providing an output of the transmitter to the receiver via the switch;
 generating a first test signal associated with the in-phase output terminal and transmitting the first test signal through the transmitter;
 estimating mismatching in a first quadrature-phase measurement signal
20 provided via the quadrature-phase input terminal and non-linearity in a first in-phase measurement signal provided via the in-phase input terminal, by processing the first test signal received via the switch in the receiver;

 generating a second test signal associated with the quadrature-phase output terminal, and transmitting the second test signal via the transmitter;

estimating mismatching in a second in-phase measurement signal provided via the in-phase input terminal and non-linearity in a second quadrature-phase measurement signal provided via the quadrature-phase input terminal, by processing the second test signal received via the switch in the 5 receiver;

calibrating, in the receiver, the mismatching measured on the first quadrature-phase measurement signal and the second in-phase measurement signal and the non-linearity measured on the first in-phase measurement signal and the second quadrature-phase measurement signal; and

10 if the calibration of the mismatching and the distortion is completed, controlling the switch to cut off a connection between the output terminal of the transmitter and the input terminal of the receiver.

6. The method of claim 5, further comprising the step of
15 attenuating at least one of the first and second test signals transmitted from the transmitter at a predetermined rate under the control of the controller.

7. A method for self-calibrating mismatching and non-linearity occurring in a receiver in a mobile terminal including a transmitter, the receiver, 20 a switch for connecting an output terminal of the transmitter to an input terminal of the receiver, and a controller having an in-phase output terminal and a quadrature-phase output terminal connected to the transmitter, and having an in-phase input terminal and a quadrature-phase input terminal connected to the receiver, the method comprising the steps of:

providing an output of the transmitter to the receiver via the switch;

generating a first test signal associated with the in-phase output terminal and transmitting the first test signal through the transmitter;

estimating mismatching in a first quadrature-phase measurement signal

5 provided via the quadrature-phase input terminal and non-linearity in a first in-phase measurement signal provided via the in-phase input terminal, by processing the first test signal received via the switch in the receiver;

generating a second test signal associated with the quadrature-phase output terminal, and transmitting the second test signal via the transmitter;

10 estimating mismatching in a second in-phase measurement signal provided via the in-phase input terminal and non-linearity in a second quadrature-phase measurement signal provided via the quadrature-phase input terminal, by processing the second test signal received via the switch in the receiver;

15 calibrating, in the transmitter, the mismatching measured on the first quadrature-phase measurement signal and the second in-phase measurement signal and the non-linearity measured on the first in-phase measurement signal and the second quadrature-phase measurement signal; and

if the calibration of the mismatching and the distortion is completed,

20 controlling the switch to cut off a connection between the output terminal of the transmitter and the input terminal of the receiver.

8. The method of claim 7, further comprising the step of attenuating at least one of the first and the second test signals transmitted from the transmitter at a predetermined rate under the control of the controller.

5 9. An apparatus for self-calibrating non-linearity in a mobile terminal including a transmitter and a receiver, comprising:

a switch for connecting an output terminal of the transmitter to an input terminal of the receiver according to a switching control signal; and

10 a controller for generating, when calibration on non-linearity is requested, a predetermined test signal after outputting the switching control signal, outputting the generated test signal via the transmitter, estimating non-linearity based on a test signal received via the receiver, calibrating non-linearity in a reception side by controlling the receiver, and calibrating non-linearity in a transmission side by controlling the transmitter.

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10. The apparatus of claim 9, further comprising an attenuator for attenuating the test signal transmitted from the transmitter at a predetermined rate under the control of the controller.

20 11. A method for self-calibrating non-linearity in a mobile terminal including a transmitter, a receiver, and a switch for connecting an output terminal of the transmitter to an input terminal of the receiver, comprising the steps of:

connecting the output terminal of the transmitter to the input terminal of the receiver by controlling the switch;

generating a predetermined test signal, transmitting the predetermined test signal via the transmitter, and estimating non-linearity based on a test signal received via the receiver in response to the transmitted test signal; and

5 calibrating non-linearity in a reception side by controlling the receiver according to the estimation result, and calibrating non-linearity in a transmission side by controlling the transmitter.

12. The method of claim 11, further comprising the step of attenuating the predetermined test signal transmitted from the transmitter at a 10 predetermined rate under the control of the controller.